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THE GIRDLED ROAD SITE, AN EARLY WOODLAND HUNTING STATION IN LAKE COUNTY, OHIO

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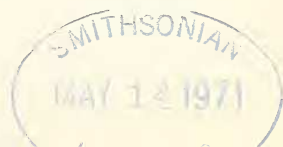
ABSTRACT

Archaeological survey of a proposed reservoir area in Cascade Valley, Lake County, Ohio, has revealed a small single-component site along the bluffs bordering Big Creek. Analyses of the recovered artifacts and the nature of their topographic and stratigraphic location indicate that the site represents a small seasonal hunting camp occupied early in the first millenium B.C.

In May, 1969, a preliminary archaeological survey of a portion of southern Lake County, Ohio, was undertaken by the author for the Cleveland Museum of Natural History. The area investigated lay within the proposed expanded boundaries of the Girdled Road Reservation of the Lake County Metropolitan Park District in Leroy and Concord townships. The proposed reservation area is bounded roughly by Winchell Road, State Route 608, and Williams Road to the west, Huntoon Road to the north, Callow Road on the east, and the Lake-Geauga county line to the south.

Topographically the area consists of a gently rolling portion of the glaciated Allegheny Plateau, dominated by the deeply incised valley of Big Creek and its tributaries, Aylworth Creek and East Creek. The latter stream represents a more juvenile (less entrenched) drainage system which appears to have been captured recently by Big Creek. East Creek presently joins Big Creek about 60 yards below the 18-foot Cascade Falls on Big Creek. This is the most steeply entrenched portion of the valley, and Big Creek flows

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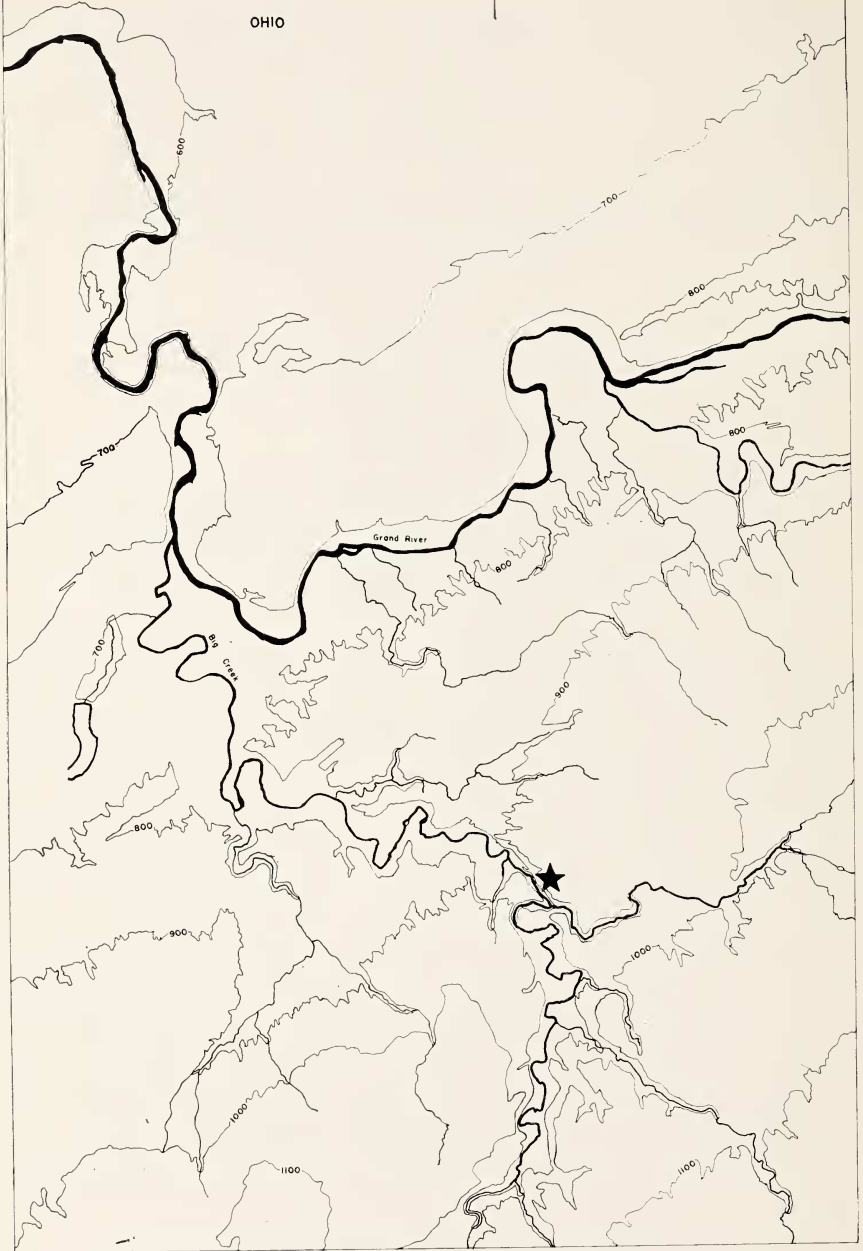


LAKE ERIE

GIRDLED ROAD SITE
LAKE COUNTY
OHIO



0 1 MILE
SCALE



approximately 150 feet below the plateau surface. This is also the widest portion of the flood plain and is called Cascade Valley. It is approximately a quarter of a mile wide from the junction of East Creek for about three-quarters of a mile downstream (northwest). Two miles below this deep valley, Big Creek flows out onto the lake plain and into Grand River approximately 5 miles above the river's entrance into Lake Erie (fig. 1). This deep valley described above was the proposed site of a dammed lake, and archaeological survey was concentrated in that area.

ARCHAEOLOGICAL RECONNAISSANCE

Several days of surface collection and archaeological testing were spent in Cascade Valley itself. With the exception of randomly distributed historic artifacts from the nineteenth and twentieth centuries, no cultural material was recovered within the Cascade Valley. The steep (over 40°) banks of the valley were too denuded by sheet runoff to offer much hope of finding in situ cultural material. It was also felt that the gradient itself should have prohibited occupation. Several test-pits each measuring 5 by 5 feet were excavated on the more gentle slopes along the western side of Cascade Valley but produced no cultural material. Archaeological testing along the east rim of the valley was limited to the undisturbed southeastern portion lying north of East Creek. A total of four 5 by 5 feet test pits were excavated which produced no cultural material. On the southernmost promontory on the eastern rim, isolated on the south by East Creek and Cascade Falls and on the north by a more gentle fifty-foot ravine cut by seasonal streams, a single short-term component was encountered at a depth of 18 inches below the surface (fig. 2).

GEOMORPHOLOGY

The occupation encountered in these tests could be followed through three 5 by 5 feet excavation units where it was defined as a thin discontinuous midden deposit lying in erosional depressions on the surface of a poorly developed soil horizon (fig. 3). The underlying grayish-brown calcareous sands displayed a poorly

◆ Fig. 1. Map showing location of Girdled Road site. Star indicates site.

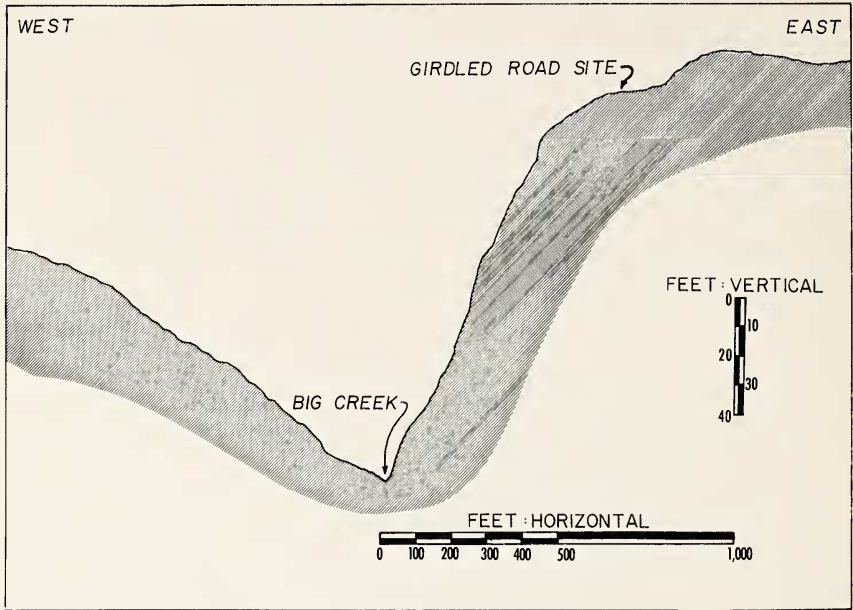


Fig. 2. Cross section of Cascade Valley traversing Girdled Road site.

sorted particle-size distribution characteristic of lacustrine deposition (Friedman, 1961, p. 514-529), probably representative of dune formation along Lake Cuyahoga about 13,000 years ago (Rau, 1969, p. 25-29). With the draining of this proglacial lake after 11,000 B.P. a period of warmer weather favored the rapid development of an "inceptisol" with a weak illuvial horizon (U. S. Soil Conservation Service, 1960). It was on this surface that the human occupation took place. Post-occupational geomorphological activity resulted in the truncation of elevated portions of the midden and burial beneath the deposition of loam eroded from further upslope. A period of lessened precipitation appears to have existed as seen in the development of a clear A_2 horizon containing fragile clay minerals (Bunting, 1965) immediately overlying the cultural materials. The present ground surface represents a historically disturbed (A_p) horizon.

The only pedological data of immediate concern are the (1:1) pH values for the soil horizon noted. The lowest (C_1) horizon has a neutral value of 6.8 while the succeeding horizons range between 4.3 and 5.7. The occupational midden itself gave pH values from

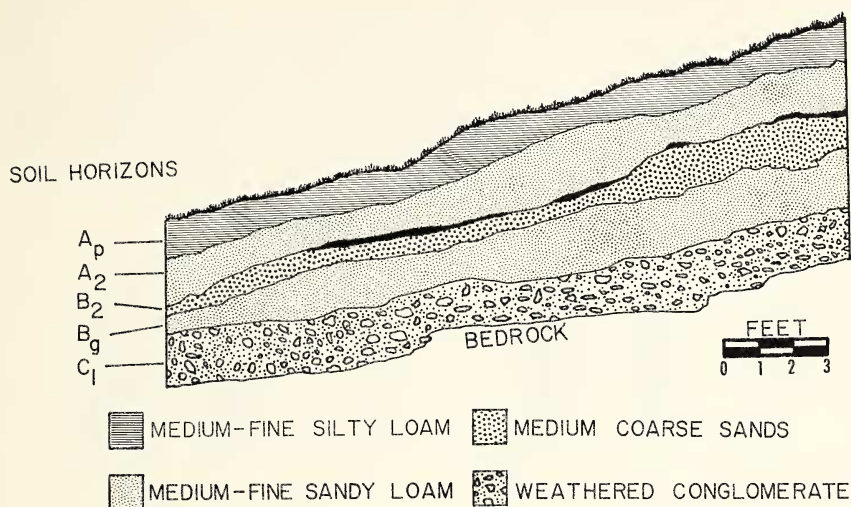


Fig. 3. Stratigraphic profile of test pits 17 and 18 excavated at Girdled Road site. Dark lenses represent cultural materials.

4.9 to 5.2. These rather acid soils clearly are a recent result of downward percolation of humic-acid-enriched rainwater (U.S. Bureau of Plant Industry, Soils and Agricultural Engineering, 1962) and have had the result of destroying most of the faunal material from this site.

CULTURAL MATERIALS

The distribution of cultural materials within the occupation area was quite disappointing. The thickness of the deposits and their lack of internal stratification indicate a single component of rather limited duration. Erosion has removed all but isolated portions of what was presumably a continuous deposit. While these diagenetic processes have rendered meaningless any attempts at analyzing the spatial distribution of the artifacts recovered, the total observed extent of the area displaying these deposits may provide some estimate of population. This point will be dealt with in the interpretive section of this report.

No features were noted at the Girdled Road site. While areal clusters of artifacts or charcoal were probably present, diagenetic erosion has removed any indications of these. Subsurface features,

however, should have been recoverable. Their absence thus confirms the suggestion of an occupation of limited duration.

Recovered artifacts consisted of three stemmed projectile points (fig. 4 A, C); two large ovate bifacial knives (fig. 4 B, D), a large bifacial sidescraper (fig. 4 E); a broken slate gorget or celt (fig. 4 F); 104 chert and flint chips; and two rolled copper beads (fig. 4 G).

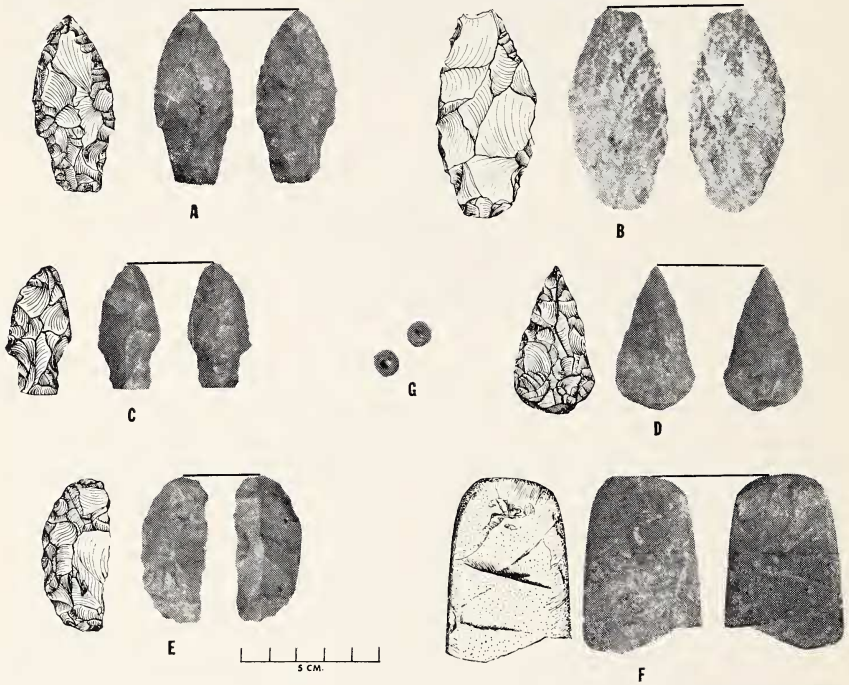


Fig. 4. Artifacts from the Girdled Road site. A, C, projectile points; B, D, bifacial blades; E, scraper; F, celt; G, rolled copper beads.

CHIPPED STONE

The chipped stone artifacts offer the best means of assigning relative temporal placement to this component. Their metric attributes are presented in table 1.

The entire lithic assemblage is typologically consistent and argues for an Early Woodland occupation. The stemmed points are morphologically and metrically analogous to the flat-based "Cresap points" which Drago (1963, p. 109-113) recovered from the Cresap

TABLE 1
 METRIC ATTRIBUTES OF CHIPPED STONE ARTIFACTS
 (In millimeters)

	Length	Width	Thickness	Haft Width	Edge Length	Raw Material
STEMMED POINTS						
	45.2	23.3	8.3	14.1	33.0	Flint Ridge Flint
	62.7	28.8	9.5	19.2	43.7	Glacial Pebble Cherts
	51.5	29.4	11.1	16.7	38.9	Devonian Outcrop Cherts
OVATE BLADES						
	52.3	29.3	9.0	—	—	Flint Ridge Flint
	73.7*	35.5	11.2	—	—	Plum Run Flint
SIDE SCRAPER						
	53.1	25.3	14.2	—	—	Flint Ridge Flint

* tip broken

Mound in West Virginia. Similar points are reported from numerous Adena Phase burial mounds throughout the upper Ohio valley (Dragoo, 1963, p. 118-121; Webb, 1942, p. 335). In northern Ohio they are associated with components of the coeval Leimbach Phase (Shane, 1967). The ovate blades from the Girdled Road site are morphologically and metrically analogous to "Adena leaf-shaped" blades or points. Such artifacts are a common type on Adena Phase sites in the Ohio valley (Dragoo, 1963, p. 107-108, Webb and Snow, 1945, p. 82) and in northern Ohio during the Leimbach Phase (Shane, 1967, p. 114-116). The large heavy sidescraper, although less useful as a horizon marker, is also a common artifact on Adena or Leimbach Phase sites throughout the state (Dragoo, 1963, p. 117-121, Shane, 1967, p. 116-117, 156, 160).

The chipping debris recovered from the Girdled Road site (table 2) appeared randomly scattered throughout the truncated midden deposit. No clusters of debitage were noted in the remaining portions of the deposit. The entire midden level was hand-screened through 3/32 inch hardware cloth and numerous small chips, often missed in conventional 1/4 inch screens, were recovered. All of the typological categories of chippage are indicative of final flaking or resharpening activities. None of the initial preparation flake categories such as cores or decortication flakes were recovered from this component (cf. Brose, 1970a).

All of the chipped stone artifacts were examined under a low power (45X) binocular microscope in an attempt to interpret their function. The three stemmed points exhibited moderate to light use on edges characterized by resolved or step-flaking. While all of these points exhibited a slight sheen or polish, this was extremely intermittent and occurred both on the flake-scar surfaces and on the interlying ridges. No evidence of use striae was observed. The ovate blades exhibited some use polish on both faces, usually confined to within 7 mm of the edge. This gloss was rather continuous, and most evident on the ridges separating flake-scars. Both ovate blades were characterized by numerous more or less parallel longitudinal striations on both faces of both edges. These striations were confined to a zone within 5 mm of the edge, extending from the tip about two-thirds of the distance along the edge of the blade. The bifacial scraper showed numerous transverse striations on the steeply retouched curved edge and faint parallel longitudinal stria-

TABLE 2
 FREQUENCIES AND WEIGHTS OF LITHIC DEBITAGE
 BY FLAKE TYPE AND RAW MATERIAL

FLAKE TYPE	RAW MATERIAL					TOTALS
	FLINT RIDGE FLINT	PLUM RUN FLINT	GLACIAL PEBBLE CHERTS	DEVONIAN OUTCROP CHERTS		
BIFACIAL RETOUCH FLAKES						
HARD HAMMER	10 (4.8 grams)	3 (1.5 grams)	2 (0.7 grams)	1 (0.3 grams)		16 (7.3 grams)
SOFT HAMMER	2 (7 grams)	19 (7.8 grams)	1 (4 grams)	—		22 (18.8 grams)
FLAT FLAKES						
HARD HAMMER	27 (12.8 grams)	6 (4.2 grams)	8 (2.3 grams)	7 (2.3 grams)		48 (21.6 grams)
SOFT HAMMER	7 (18.7 grams)	8 (2.2 grams)	3 (4.3 grams)	—		18 (25.2 grams)
TOTALS	46 (43.3 grams)	36 (15.7 grams)	14 (11.3 grams)	8 (2.6 grams)		104 (72.9 grams)

tions along the straight edge. Numerous areas of high-use polish were observed on both faces of this artifact.

The comparison of wear patterns observed on these artifacts with experimentally produced data (Semenov, 1964) provides the functional interpretation of these artifacts with a considerable degree of confidence. The stemmed points display evidence of use fully consistent with their functional interpretation as projectile points, probably used in mammal hunting. The ovate blades show evidence of wear characteristic of hafted knives used for cutting rather soft material which occasionally encountered a more resistant material. The bifacial scraper seems to show evidence of use characteristic of two separate functions. It appears to have been used as a hand-held scraper for hides, and as a backed hand-held knife, probably for skinning.

There is no evidence to support the contention that the ovate blades represent preforms or an earlier stage in the production of the stemmed projectile points. The ovate blades display distinct wear patterns indicating that they functioned as a finished artifact. In addition, the stemmed points display no wear patterns consistent with their earlier use as knives. The two classes thus seem to represent functionally, as well as typologically, distinct artifacts.

The entire chipped-stone complex is clearly indicative of hunting and butchering activities with occasional refurbishing of knives and projectile points but no actual tool manufacture. The analyses of raw materials utilized in artifact manufacture has led to the recognition of four distinct sources. These sources are Flint Ridge Flint, Plum Run Flint, Devonian Outcrop Cherts, and glacially derived Pebble Cherts. The mottled gray and brown pebble cherts occur commonly in the till and outwash formations of the glaciated Allegheny Plateau region of northeastern Ohio. The Devonian Outcrop Cherts represent a variety of light tan cherts common in nodules or beds in formations pertaining to the Devonian System. Around the western end of Lake Erie such outcrops in Dundee Limestone formations are noted in Hillsdale, Lenawee, and Monroe counties in Michigan, and in the Delaware Limestones in Lucas, Ottawa, Erie, and Sandusky counties in Ohio (Brose [in press]; Stout and Schoenlaub, 1945). The Plum Run Flint, which appears to be a facies of Upper Mercer Flint, and the Flint Ridge Flints have been discussed extensively in the literature of Ohio archae-

ology. The comparison of raw materials utilized in artifact manufacture and raw materials exhibited in the chipping debris recovered from the Girdled Road site (table 3) clearly indicates that

TABLE 3
LITHIC PRODUCTION AGAINST RAW MATERIAL CATEGORIES
BY WEIGHT (in grams)

	RAW MATERIAL			
	FLINT RIDGE FLINT	PLUM RUN FLINT	GLACIAL PEBBLE CHERTS	DEVONIAN OUTCROP CHERTS
ARTIFACTS				
Observed	62.7	18.5	16.2	9.5
Expected	63.0	20.4	16.4	7.2
DEBITAGE				
Observed	43.3	15.7	11.3	2.6
Expected	43.0	13.9	11.1	4.9

$X^2 = 2.2339$; $df = 3$; $p = .50$; $\phi = .0124$; $n = 179.8$

there is no statistical significance to the variations observed. Given the size of the sample, the observed variations could be expected by chance alone nearly fifty times out of a hundred if only a single population were involved. The implications that the recovered chipping debris was derived from the recovered artifacts seems to be well founded. Certainly, neither all of the artifacts utilized at the site, nor all of the debitage has been recovered. It is still quite clear that we would not expect further samples to show radically different proportions of the source materials already noted.

GROUND STONE

A single broken rectangular celt, manufactured from Bedford Shale, was also recovered from the midden deposits. The celt is 65.5 mm long, with a maximum width of 44.0 mm and a maximum thickness of 8.9 mm. Heavy transverse striations were noted on both faces of the 11.2 mm portion of working edge which remained intact, making it probable that the implement functioned more as an axe than as an adze. The strong bedding planes within the rather brittle shale make it appear unlikely that the celt was intended for woodworking. Similar rectangular celts occur occasionally throughout the Ohio area in Early Woodland contexts (Dragoo, 1963; Shane, 1967) although they are usually manufactured from igneous or metamorphic rock. Small rectangular celts of sedimentary rock are increasingly common in later periods in this region.

COPPER

Two small rolled copper beads recovered from this component have analogs in the Great Lakes-Ohio valley region from the Late Archaic (2000 B.C.) through the transition to Late Woodland (A.D. 500). Both beads are quite similar, having been manufactured by cold-hammering native copper (common throughout the Upper Great Lakes) into flat sheets, then folding and cold-hammering these sheets into more or less rectangular strips. The rectangular strips would then be wrapped about some sticklike object and cold-hammered to form an overlapping rolled copper bead. All ductility had been lost at this stage of the manufacturing process. The larger bead with an internal diameter of 2.9 mm and an external diameter of 11.1 mm had been formed of a rectangular strip which was 17.4 mm long, 7.0 mm wide, and 2.5 mm thick. The smaller bead with a finished internal diameter of 2.5 mm and an external diameter of 10.2 mm had been rolled from a rectangular strip 16.8 mm long, 6.33 mm wide, and 2.3 mm thick.

Copper beads of this type represent a common artifact form in Early Woodland sites throughout the region. They are ubiquitous on those sites in the Ohio valley identified as Adena (Dragoo, 1963, p. 121-123; Solecki, 1952, p. 370; Webb and Snow, 1945, p. 99-100; Bache and Satterthwait, 1930, p. 140). They have also been recovered from most of the major components of the coeval Leimbach Phase in northern Ohio (Shane, 1967, p. 23).

EXTERNAL CULTURAL RELATIONSHIPS

TYPOLOGY

The entire material culture assemblage from the Girdled Road site is clearly related to the Early Woodland materials within Ohio. Recently there has been an attempt made to denigrate McKernian nomenclature and to refer to archaeological manifestations in terms of phase and tradition as expounded by Caldwell (1958). In this region, Prufer and others (1965) have discussed the regional Scioto Tradition which seems to extend over the entire Great Lakes-Ohio River drainage system. Within this Tradition, Shane has distinguished two contemporary phases during the first millenium B.C.: the Adena Phase in the Ohio drainage basin, and the Leimbach Phase to the north, with the only distinction between these phases based on minor ceramic variations. A critical discussion of these taxonomic questions already exists (Fitting and Brose [in press]) and need not be repeated here. What is important is the recognition of the close relationship between these two contemporaneous phases which should probably be considered a single phase of two distinct traditions within a Scioto Co-Tradition (cf. Willey and Phillips, 1958). As Shane himself has noted, the differences are merely geographic.

Typologically, all of the Girdled Road site material can be considered characteristic of materials more generally referred to as "Adena." There are several problems with this approach, however. As Webb and Baby (1957, p. 32) noted, one of the more salient features of the Adena People on their own turf is their skill at disguising information pertaining to their settlement system. Our knowledge of Adena architecture is primarily from charnel houses. Our understanding of the role which factors of topography and geography played in the patterning of sites is largely confined to some knowledge of the location of their more elaborate ceremonial mounds. Even our conception of the material culture of the Adena People is generally restricted to grave goods. Our appreciation of the extractive economy (or economies) which supported the Adena mortuary complex is severely limited and virtually worthless in reconstructing any kind of cultural ecology. The supposition that several Kentucky rock shelters were utilized as temporary hunting camps is inferential. "What people, other than the Adena Indians, could have been in these shelters, so close to the region of Adena

permanent residence, at that period?" (Webb and Baby, 1957, p. 34).

The Early Woodland period in northern Ohio was quite obscure until the recent excavations and restudy of extant collections by Orrin C. Shane III (1967). Shane has documented a number of sites located in the south-central portion of the Lake Erie drainage basin which display clear affinities with the more southern classic Adena mounds. The type site of this Phase is the Leimbach site on the Vermilion River in Lorain County, Ohio. Here Shane excavated a large midden (estimated to represent an occupation area of more than 15,000 square feet) which varied between three and eight inches in thickness. The midden contained numerous features, one of which indicated a circular structure 40 feet in diameter. This midden contained considerable amounts of ceramics which Shane has assigned to Fayette Thick, Adena Plain, and two new types, Leimbach Thick and Leimbach Cordmarked. The Leimbach ceramics clearly are a local variation of the general Early Woodland ceramic assemblage throughout the northeast. This is the sense in which Shane defines the Leimbach Phase and a coeval Adena Phase.

One of the major contributions of Shane's Leimbach excavations is his demonstration that the number and size of features in the Early Woodland occupation implies a semipermanent small village in the settlement system. Of the three radiocarbon samples submitted, the two noncontaminated ones provide dates of 540 B.C. \pm 309 years (Shane, 1957, p. 136) thus establishing the chronological position of the site. At this same time period (as determined from ceramic affinities) Shane also recognizes several other related components on northern Ohio. The lower levels of the Mixter site in Erie County represent a hunting station contemporary with Leimbach. The earlier collections from the Burrell Fort site on French Creek in Lorain County, Ohio, were reanalyzed and a portion of the site was re-excavated by Shane to reveal an early component with material similar to the Leimbach site midden. The Seaman's Fort site on the Huron River, Erie County, Ohio, excavated since 1945 by R. Vietzen was visited by Shane in the summer of 1966. While the site was badly disturbed, Shane was able to analyze earlier collections and concluded that there was an early component at Seaman's Fort, again coeval with the Early Woodland occupation at Leimbach. He further noted (1967, p. 158) that the

site was probably functionally similar to Leimbach in that it also represented a number of seasonal semipermanent occupations. An analysis of ceramics in the Ceramic Repository at the University of Michigan Museum of Anthropology lead to the recognition of another small component of the Leimbach Phase from the Mohawk Park Rock Shelter in Geauga County, Ohio.

In addition to Shane's analyses, numerous radiocarbon dates exist for Adena burial mounds within the Ohio River drainage system. Again it should be emphasized that Adena, as this term is presently used, is certainly not a culture in spite of Shetrone's (1920) original suggestion that it represented one tribe or nation. The succeeding decades, with the collection of data in a haphazard and atheoretical manner, have done little for the Adena concept other than to make Shetrone's definition less acceptable. The "traits" of Adena may be technological or economic, but for the most part are ideological. As Griffin (1948) pointed out a quarter of a century ago, a mortuary complex is not a culture.

Adena as a mortuary complex must be separated from Adena as a settlement system and Adena as a nonmortuary style zone, the latter perhaps representing some strain of ethnic unity similar to that suggested by Shetrone. Even from preliminary analysis it is clear that the distribution of these three aspects of Adena are not coterminous.

Dragoo (1963, p. 288-297) has presented a large series of radiocarbon determinations relating to the problem of placing Adena in some absolute chronological framework. He strongly states that ". . . on the basis of typology and stratigraphy, I seriously doubt that any Adena site in the Ohio Valley would have been in existence much after A.D. 1 or perhaps even earlier." (ibid. p. 289) While this statement may be a bit too definite, one could note that many of those dates after A.D. 1 were based on the carbon-black laboratory procedure and are therefore rather untrustworthy. With the exception of the Drake, Florence, and Cowan Creek Mounds, all the Adena dates seem to fall within the first 1500 years B.C., and recent evaluations of fluctuations in the upper atmospheric production of C^{14} make it likely that those radiocarbon dates around the time of the birth of Christ should be pushed back, perhaps as much as several hundred years. In New York, Ritchie (1969, p. 170-178, 181-201) places his Orient Phase at 1000-700 B.C. and the Meadowood Phase at 1000-500 B.C. The former phase has most of

the artifacts and burial customs common to Adena. The latter phase is distinguishable from Red Ocher sites in Michigan only by (1) the geographic location, (2) the fact that Meadowood burials contain more indications of widespread trade in luxury items, and (3) definite associations with Early Woodland ceramics. The Glacial Kame "culture" also appears to fall within this period of the first 1500 years B.C. and it is becoming increasingly clear that many of the "later" Old Copper manifestations do as well. (Halsey, 1966).

It may be of some interest to note that the area of western Lake Erie does not seem to show much evidence of occupation at this time. Survey work in southeastern Michigan by Brose and Fitting, and the surveys of northeastern Ohio by Earl J. Prahl of the University of Toledo have revealed an apparent hiatus in the occupation of the old lake plain area from the end of the Middle Archaic period (ca. 1500 B.C.) until the transitional Middle-Late Woodland period (ca. A.D. 700). The significance of this negative evidence which is also duplicated in southwestern Ontario (John Lee, personal communication) will perhaps become apparent when some reasonable approximation of Early Woodland settlement systems is obtained.

At any rate, it seems clear that the Girdled Road site represents an occupation during this ill-defined and poorly understood period when Late Archaic and Early Woodland burial cults were flourishing throughout the eastern United States. The conclusions which can be drawn from the analyses of this site may perhaps dispel some of the confusion, at least in the limited area of northeastern Ohio.

CONCLUSIONS

While diagenetic soil conditions prevented the recovery of any significant sample of faunal remains, some inferences as to economic adaptation can be made from other data. The stratigraphic data, the topographic location of the Girdled Road site, and the lithic materials recovered all argue strongly for a limited-duration occupation. Although the midden itself was discontinuous, the maximum boundaries of occupation were about 20 feet by 15 feet. The rough ellipse appears to have enclosed an area of approximately 235 square feet. On the basis of modern ethnographic accounts pertaining to the Indians of the Upper Great Lakes, this would have been an area of floor space within a structure sufficient for

from three to eight individuals (cf. Brose, 1970b). Since no post-molds or features were encountered at the Girdled Road site, it would seem that no such structure was erected.

The total absence of ceramics also argues for a short-term occupation, probably by a group whose sexual composition was unbalanced with few (if any) females represented. The above data point rather clearly to the Girdled Road site as an example of a temporary hunting station occupied by a group of males. There was a surprisingly large number of unbroken artifacts recovered from approximately one-third of the total available site area. This probably indicates that the site was occupied several times for short periods. In this respect one might note that Dragoo (1963) has indicated that the variations in projectile point morphology reflected in the sample from Girdled Road may be chronologically significant.

The Girdled Road site thus represents an Early Woodland hunting station similar to other northern Ohio sites such as the lower levels at Mixer, and the Burrell Fort site (Shane, 1967). The analysis of lithic sources indicates that the occupants of the Girdled Road site either moved seasonally throughout the north-eastern third of the state of Ohio to obtain these materials, or were in contact with numerous localized groups located therein. While it is probable that exotic material such as Lake Superior copper was obtained by trade of some sort (Fitting and Brose [in press]) it is not likely that low-quality cherts and flints would have entered such a network. The implications are that the group experienced considerable seasonal mobility as a result of their economic adaptation. While this adaptation is imperfectly known, it must have included fairly large semipermanent or permanent villages such as Leimbach, as well as seasonal special-purpose extractive camps, presumably for hunting large mammals. There is no evidence for seasonal fishing or waterfowl-collecting camps, although too little site survey has been performed along the lake shore to evaluate this negative evidence. The evidence for horticultural or agricultural activity at this time level is not only extremely limited (Vickery, 1970) but is equivocal at best. The total settlement system of these populations thus remains rather ambiguous. Not until considerable further excavation has been done will we be able to discuss the inter-relationship of culture and ecology during the Early Woodland period.

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